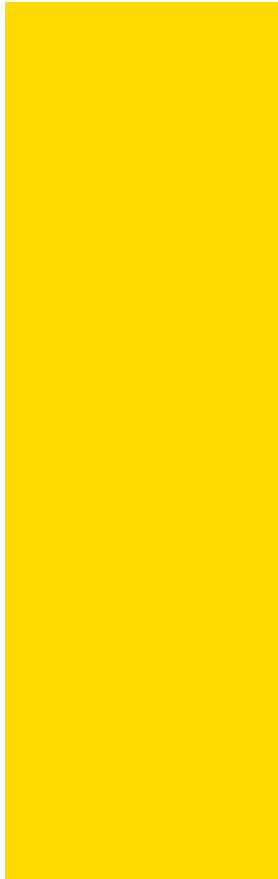


Pangbourne | technology centre



Pangbourne technology centre

Becoming undisputed technology leaders

Pangbourne is the headquarters of BP Fuels and Lubricants Technology.

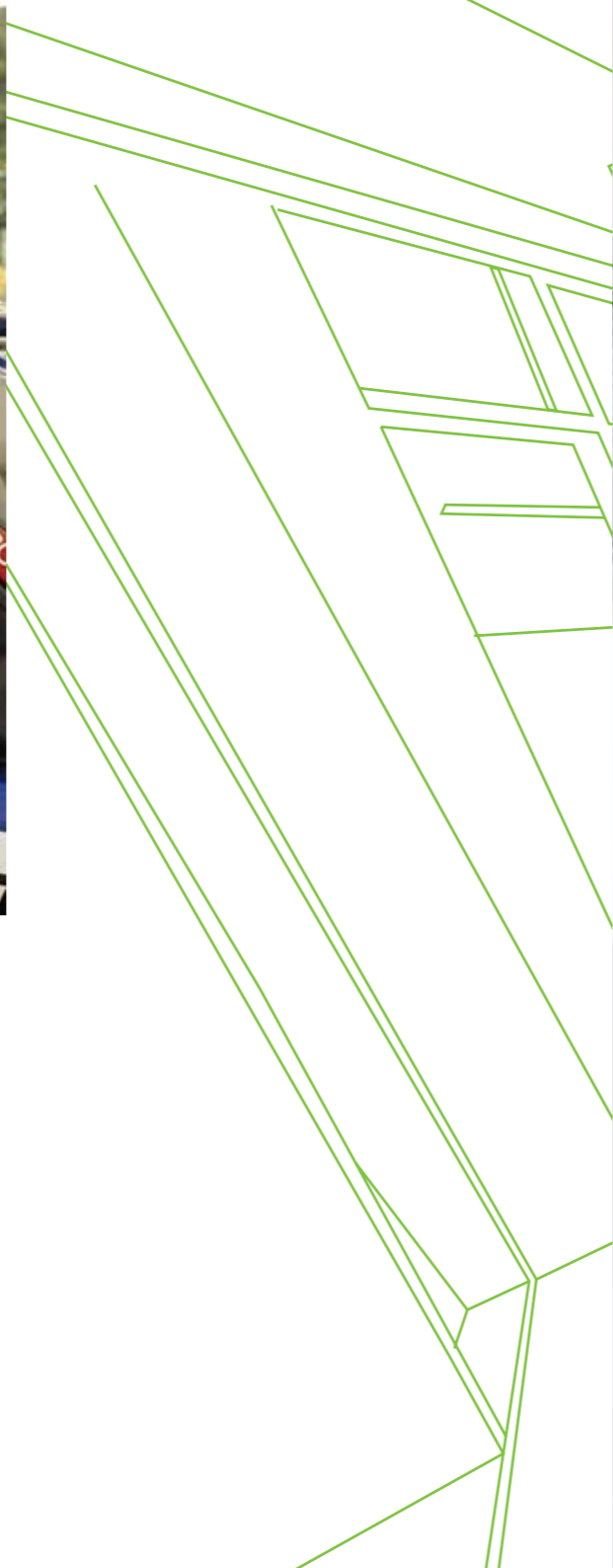
It is the central hub of our global network of Technology Centres, which enables pioneering research and development of fuels and lubricants, plus technical support for our customers.

As an organisation, technology is at the heart of everything that we do and our vision is to be the undisputed leader in the markets in which we operate. Achieving that relies both on great technology and also our people and their values. We therefore promote high standards of safety, integrity and performance across all our businesses, and expect commitment from our people to uphold these values.



"The key elements that differentiate BP's fuels and lubricants technology above our competitors' are a focus on superior product performance and quality; the strength of our relationships with key customers, and – above all – innovation, which is crucial to maintaining competitive advantage."

**Angela Strank,
Technology Vice President,
BP Fuels and Lubricants Technology**





fuels and lubricants technology

Developing innovative fuel and lubricant solutions

There are over 700 employees working within our Fuels and Lubricants Technology groups globally, developing and supporting innovative products and offers for the specific needs of our customers.

Our Fuels Technology team is responsible for developing and supporting new and improved regular and premium automotive fuels, as well as coke and bitumen products. Each fuel is tailored specifically for the requirements of its market, whether in North America, Europe, Southern Africa, Australia or New Zealand.

Our Lubricants Technology team develops novel lubricant products and offers for customers in 130 countries worldwide, and has market-leading in-house formulation expertise. The complete product range includes aviation lubricants; automotive lubricants for gearboxes, axles and engines; fluids and greases for energy, marine and industrial applications, plus specialised industrial fluids, such as cutting oils and metal forming fluids.

As an integrated part of Fuels and Lubricants Technology, our global Product Stewardship group ensures that all products meet strict health, safety and environmental considerations, and that all legal and performance requirements are met within each of our markets.



BP Fuels and Lubricants Technology develops the technology behind well-known brands such as BP Ultimate and Castrol Magnatec.



technology centre network

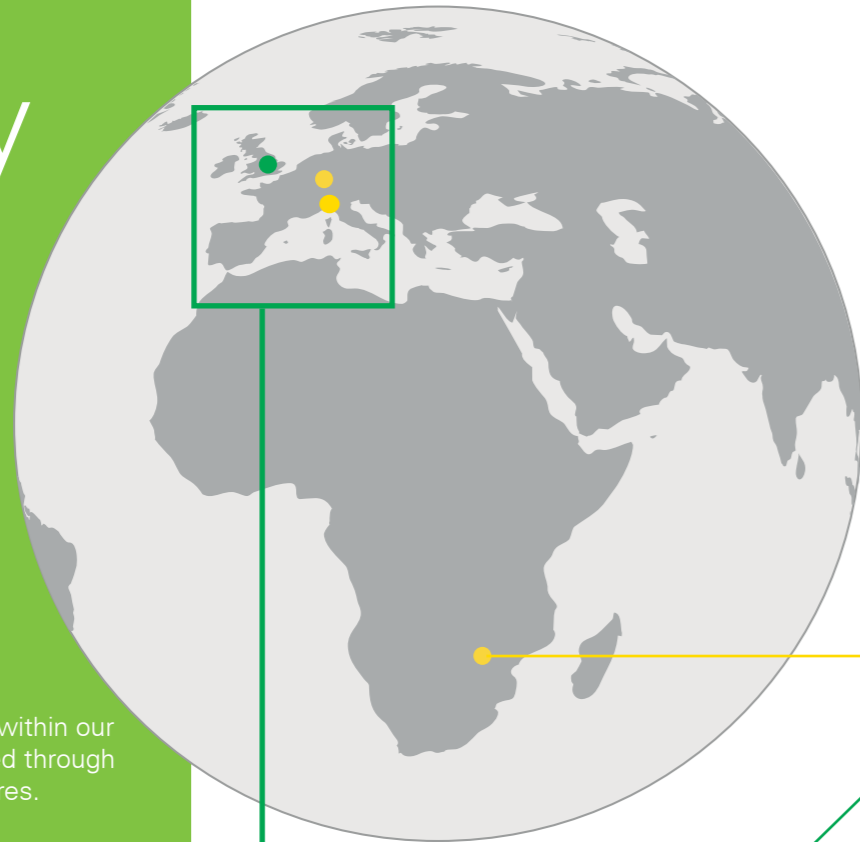
BP Fuels and Lubricants has a global presence

The full range of capabilities that are available within our global technology organisation can be accessed through any of our thirteen individual Technology Centres.

We have fuels and lubricants experts based in eighteen different countries world-wide, and provide support in many more. We pride ourselves on recruiting talented and diverse people who understand the specific requirements of the countries in which we do business and the communities where we are based.

Local employees with specialist knowledge make it easy for customers and partners to engage with our market-leading capabilities. That means exceptional local support, backed-up by a world-class technology organisation.

Our technology centres also maintain the highest levels of quality, environmental, and health and safety management, with many certified against internationally recognised standards.



Around the world, BP operates more than 30 lubricant blend plants; supplies jet fuel at over 630 locations in 59 countries; delivers marine oils into more than 750 ports in 80 countries, and operates one of the largest retail networks and fuel delivery services.

Johannesburg provides technical services for automotive fuels.

Pangbourne, near London. formulates automotive fuels; automotive, marine, Global Product Stewardship, and energy lubricants, and delivers technical support for lubricants.

Neuhof, Hamburg develops lubricants for gearboxes, axles, clutches and other driveline applications.

The central bitumen laboratory at Gelsenkirchen refinery is responsible for the development and support of bitumen products.

Bochum offers advanced performance testing facilities to support automotive fuel development, as well as providing fuels quality, market and technical support.

Mönchengladbach formulates specialised industrial products.

Turin provides technical services for industrial lubricants.



Naperville, near Chicago develops aviation lubricants, Global Product Stewardship and provides technical services for fuels, industrial lubricants and bitumen.

Wayne, near New York. develops unique automotive lubricant components and offers regional technical support.

Huntington Beach, near Los Angeles. provides technical services and research and development for coke.



Pangbourne, UK



Naperville, USA



Nagoya provides technical services for automotive and industrial lubricants.

Shanghai provides technical services for automotive, industrial and marine lubricants.

Wadala, Mumbai provides technical services for automotive and industrial lubricants.



Shanghai, China



Mönchengladbach, Germany



The most valuable assets we have are our people, their expertise and their enthusiasm for technology.

Pangbourne people and capabilities

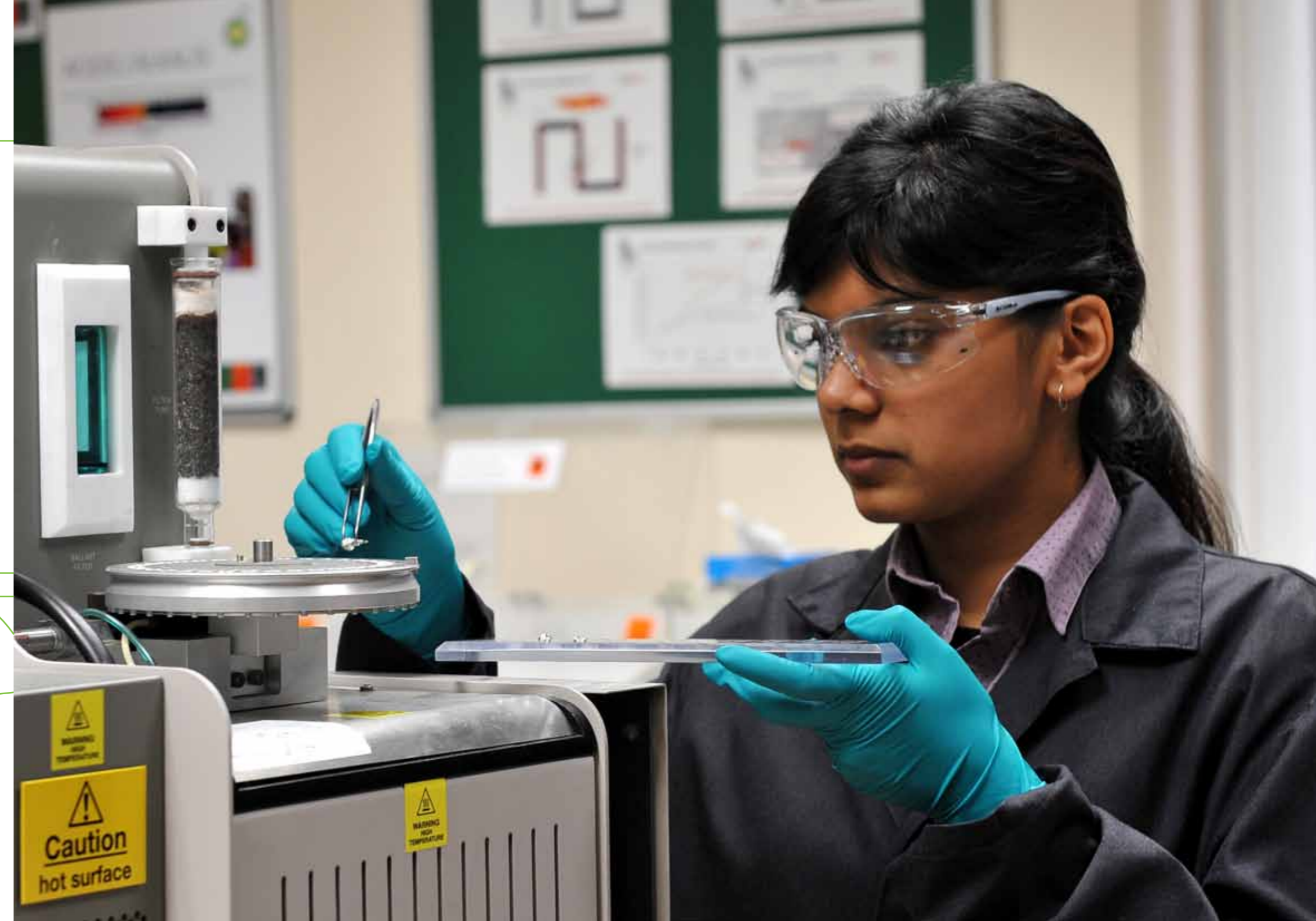
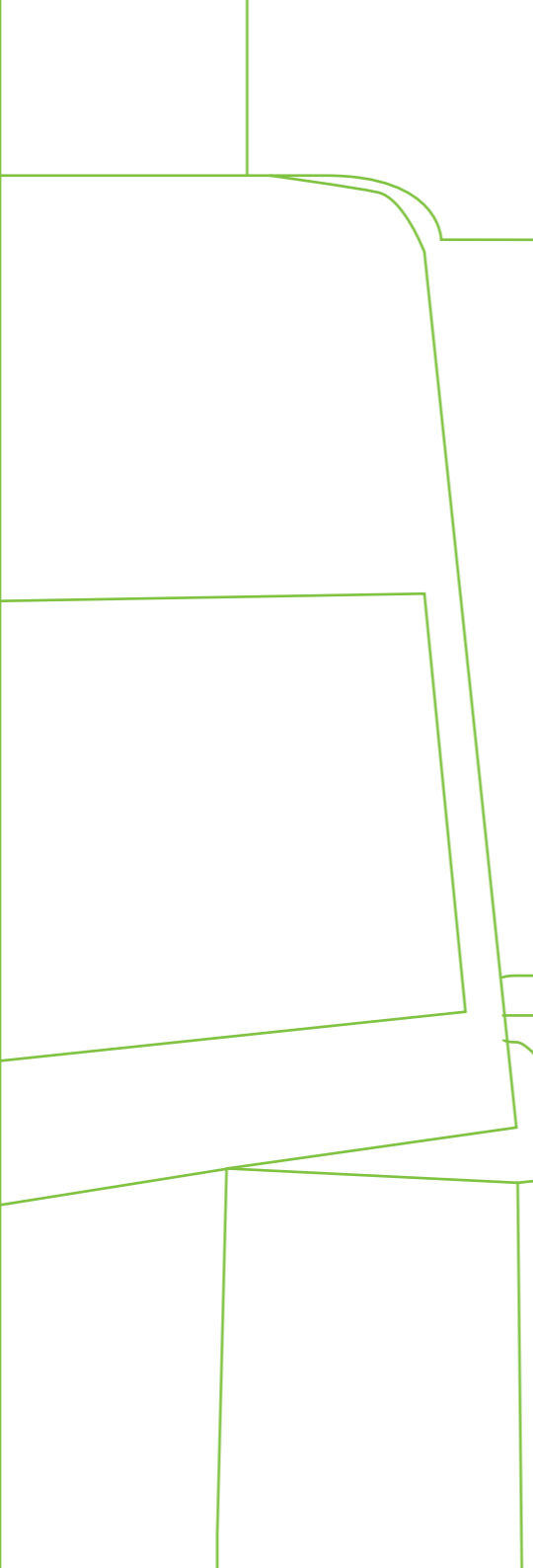
A world-class facility with exceptional people

Pangbourne is a truly unique site that combines state-of-the-art facilities with a picturesque rural landscape. It is home to a unique pool of talent and capabilities that are central to our global strategy.

Our main focus is developing products for fuels and lubricants under the BP and Castrol brands, something that we have done here for more than 30 years. Indeed, some of BP and Castrol's best known products, such as BP Ultimate and Castrol GTX, were developed at Pangbourne.

State-of-the-art analytical labs, extensive testing equipment, fluid blending facilities and many other valuable assets are located on site. In fact, many of the functions performed at Pangbourne can only be conducted here.

But it's our people that are our greatest asset. More than 350 highly skilled chemists, engineers and other specialised staff work at Pangbourne. The strength of that richly experienced and expert workforce is what consistently sets our products above those of our competitors.





BP's in-house formulation expertise enables us to design and develop our lubricant products in a unique way, using the latest additives, components and base oils.

Lubricants research and development

Developing outstanding products for our customers

Our Pangbourne-based development teams constantly strive to develop new and improved lubricant products.

From everyday automotive engines right through to the largest marine and industrial applications, our relentless drive for innovation delivers ever-improving performance to customers. And by working intimately with those customers, we tailor our products and offers to their specific requirements, helping them unlock new sources of value and efficiency.

We also work closely with our partners, sharing detailed information during the product development process. This collaborative approach means that we can apply our combined expertise to every product, helping push the boundaries of lubricant technology and drive greater performance and differentiation.

But it is our pioneering research into new technologies that really gives us an edge. Our dedicated research team avidly follows scientific developments, and tirelessly investigates and experiments with new technology, hardware and fluids. Every single technological breakthrough is fed directly into our product development team as the basis for potential future products





Understanding how our fuels work in the latest hardware technology is an important part of the development process.

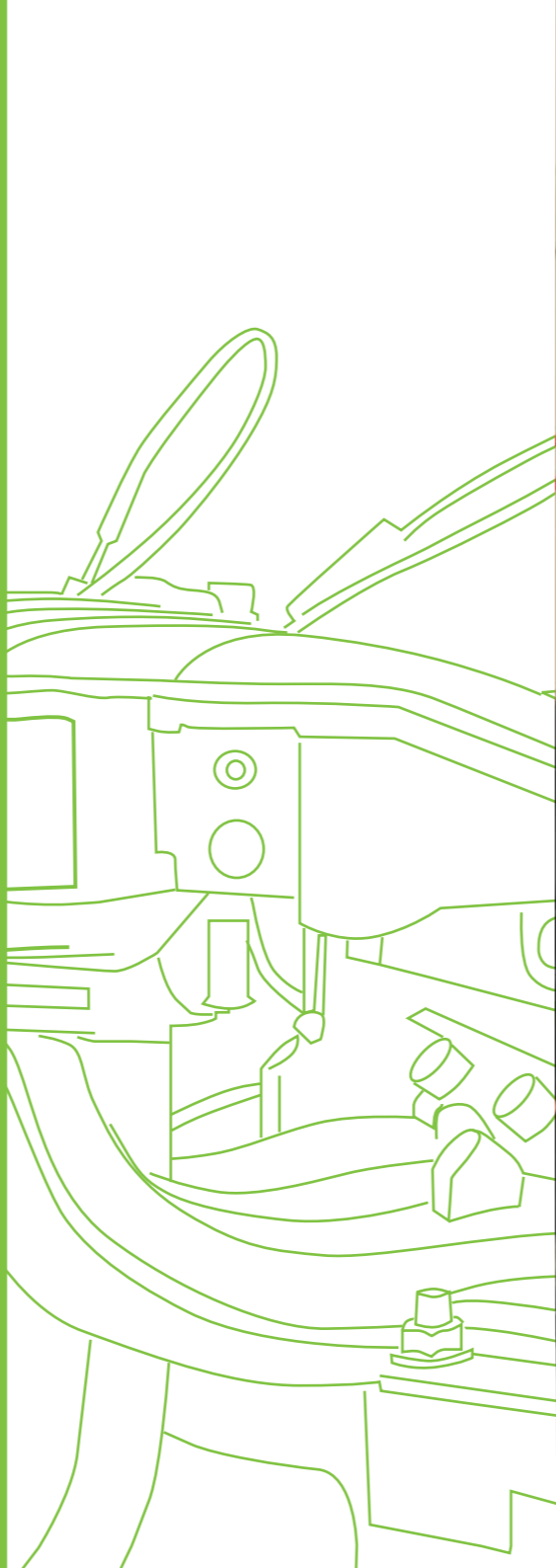
fuels research and development

New and differentiated fuel products and offers

Pangbourne is also home to our automotive fuels product development and research teams, who are dedicated to developing the latest automotive fuels.

The team is focused on developing new, differentiated fuels that deliver distinctive and tangible benefits to our customers, currently marketed under the BP Ultimate and Invigorate brands. They also evaluate the performance of all fuels, in combination with new and different types of biofuels, to ensure that we deliver consistent performance and confidence as legislation evolves.

Our fuels research team supports the product development team by studying, testing and evaluating new hardware technologies and fuel components that might offer performance benefits in future products. Also, by working side by side with our lubricants research team, both teams are able to share insights, knowledge and opportunities for further innovation across both spaces.





support and quality assurance

Leading the way in customer care and technical services

Our fuels and lubricants products and offers are backed-up by a globally distributed Technical Support and Quality Assurance team.

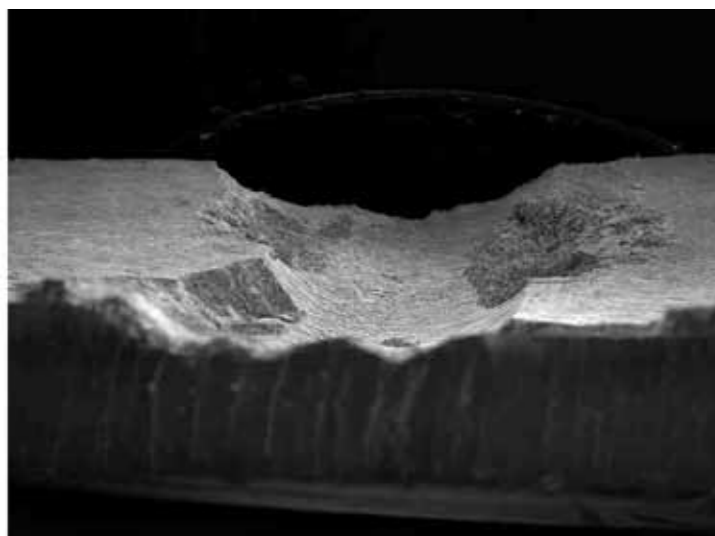
Technical services and support are delivered regionally by our network of Technology Centres, providing timely and reliable advice to customers and partners, wherever they may be. Our highly skilled employees are on-hand to offer expert help with technical challenges. Such dialogue is crucial in developing strong, lasting relationships, and also helps us keep up with changing market needs.

For fuels, technical support is also necessary to manage change locally when new fuel products and formulations are launched, and also when specifications change. Crucially, the Technology Centre network provides a support infrastructure through which customers and partners can engage with our local expertise and knowledge, whatever their requirements.

Our quality assurance teams around the world uphold rigorous standards and ensure that these are enforced across all of our facilities consistently and effectively. Their objective is to ensure that our products comply with regional regulatory requirements and that customer expectations are always met, thereby maintaining the reputation of our brands.



BP works closely with customers in more than 100 countries around the world, providing support and expertise.



The scanning electron microscope (SEM) is just one of many pieces of equipment that enable us to acutely analyse fuels, lubricants and hardware.

fluid analysis laboratories

Investigating, analysing and delivering insight

Our analysis laboratories at Pangbourne offer comprehensive investigative and analytical facilities, along with the expertise to resolve complex technical issues.

Forensic research and study into fluids is conducted by our highly experienced team of analytical chemists. All the techniques and facilities for product development and technical support across our entire lubricants and fuels product range are available on-site, and supplemented by a strong network of external contacts.

We run around 70,000 individual tests each year using more than 100 different test methods. These include elemental analysis to quantify additives and contaminants; physical testing of density, rheology and other properties; wet chemistry; thermal analysis, oxidation and corrosion.

Our dedicated specialists can provide help and advice on each technique, and also come up with testing methods for new customer requirements. We also offer support to customers on safety, standards and training.





performance testing laboratories

Putting our products through their paces

Pangbourne is home to state-of-the-art performance testing facilities with small-scale rigs, fired engines, and a full-vehicle test centre.

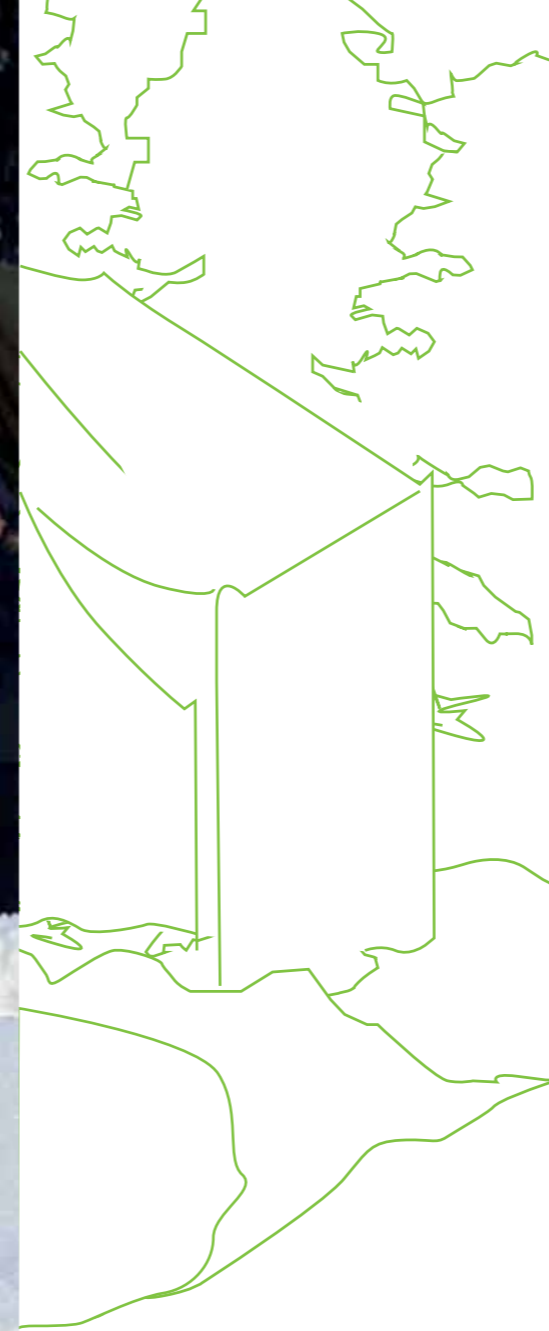
Rig tests enable us to quickly and effectively screen fuel and lubricant performance in specific situations by simulating the operation of critical engine, transmission and machine components under controlled conditions. Many of the rigs we use at Pangbourne have been developed internally and are unique within the industry.

Fired engine testing enables us to assess the capabilities of fuels and lubricants in fully-built hardware. All of our engine tests are designed specifically to demonstrate the unique performance of our products, or to satisfy the requests of our customers.

Our performance labs also house a vehicle test centre which has a rolling road in a climatic chamber. This enables us to evaluate the impact of our products on performance, emissions and fuel economy in real vehicles over a variety of drive cycles, and at temperatures ranging from -25 to +25 °C.



Specialist robotic control systems for both cars and motorcycles ensure that results are extremely accurate and repeatable in every test in the vehicle test centre.



extreme performance

Pushing the limits of our products and their applications

Our network of Technology Centres delivers advanced fuels and lubricants expertise throughout the world, suitable for almost any application.

With over 100 years of international motorsport activity, we are proud of our long-standing association and alignment with motorsports that strive to deliver outstanding technology and performance.

We develop leading-edge products that are designed to perform in the most extreme machines and environments in the world. Our uniquely developed fluids and dedicated technical support enable our partners to push the performance limits of their vehicles, and stay one step ahead of the competition.



BP and Castrol have long been associated with leading teams and personalities in the world of motorsport.

heritage

More than 100 years of technological innovation

The BP and Castrol brands are both built on a rich heritage spanning over 100 years.



BP

1908

Anglo-Persian Oil Company (APOC) is formed to commercialise a giant oil field discovered in Persia by William Knox D'Arcy's explorers.

1917

APOC acquires the British Petroleum Company, a UK petroleum distribution company, and starts to use BP as a brand name for petrol.

1923

Standard Oil of Indiana (later Amoco) discovers the anti-knocking properties of lead tetraethyl in gasoline.

1936-1940

Richfield Oil (later ARCO) produces the first gasoline with an octane rating of 100. Anglo-Iranian Oil Company (AIOC), formerly APOC, invents the alkylation process, a major development in the production of aviation fuel with a high octane rating.

1952-1954

AIOC changes its name to British Petroleum. BP commissions its first lubricating oil plant at Dunkirk refinery and starts marketing Visco-Static, Europe's first multi-grade motor oil.

1977

Amoco becomes the first company to offer unleaded regular and premium grades across the USA.

1986

Amoco Ultimate, an ultra-low sulphur content fuel with improved emissions is introduced in the USA.

1998-2002

BP engages in a series of mergers and acquisitions bringing together Amoco, ARCO, Veba, Vastar and Castrol.

2006

BP and DuPont form a partnership to develop, produce and market a next generation of biofuels to help meet increasing global demand for renewable transport fuels.



Castrol

1899

Charles Cheers Wakefield finds CC Wakefield and Company, supplying oils to the UK railways.

1909

Research chemists at CC Wakefield discover a means of blending castor oil with the finest quality mineral oil for improved performance over a wide range of temperatures – the products are branded Castrol.

1920s-1930s

The World Land Speed Record is broken 23 times, 18 of them using Castrol. Wakefield uses these record-breaking feats to advertise the Castrol brand.

1935

Castrol launches a major new product, called "Patent Castrol," which is the world's first lubricant to contain metallic soaps which reduce major causes of engine wear.

1953

Castrol develops R20, the first semi-synthetic racing motor oil.

1960s

CC Wakefield becomes Castrol. Castrol launches GTX, the first multi-purpose 20W-50 engine oil, which becomes the most famous motor oil in the world.

1976

Castrol produces lubricants for Concorde.

1997-2000

Thrust SSC sets a new World Land Speed Record of 763 mph (1227 kph), faster than the speed of sound, using Castrol lubricants. Three years later Castrol is acquired by BP.

2005

Castrol launches Edge, the new flagship range of automotive engine oils for high performance and modified modern vehicles.





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